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Local impact of community renewable energy: A case study of an Orcadian community-led wind scheme

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ABSTRACT

Local benefits of community renewable energy (CRE) –ranging from an increase in social cohesion, jobs, services, knowledge and skills - are widely assumed in academia and among policy makers. However, there are both a lack of evidence on these impacts and a lack of formal impact assessment methodologies to assess them. This research explores change mapping, an impact assessment methodology, to contribute to evaluative frameworks for assessment of the effects of CRE projects on their host communities. With this methodology, the local impacts of a 900 kW community wind project on the Scottish island Shapinsay are assessed, using an exploratory survey, interviews, and two focus group sessions. When it comes to the local impacts, the biggest changes residents experience are either direct or indirect effects of the RE revenues. Modest but ostensible effects are visible on local economic development, social cohesion, and knowledge and skill development. From the case study can be concluded that community-ownership of energy technologies can indeed be empowering, but also creates vulnerability. Stable energy policies and support during the operational phase are needed to keep up the stream of RE income that functions as a source of independent income.

1. Introduction: where carbon reduction meets community empowerment

Scottish community renewable energy (CRE) is booming with a growth from a few scattered projects at the advent of the millennium to almost 70 MW in 2017, representing nearly 1% of Scotland's onshore renewable energy (RE) production (Local Energy Scotland, 2017; DBEIS, 2017). This rapid development of a community energy movement cannot be seen in isolation from the UK Government's national RE subsidies and Scotland's devolved government's favourable policy and funding climate of the recent years. The 2002 UK Renewables Obligation, introducing the Renewables Obligation Certificates (ROCs) and later on also the 2010 Feed-in-Tariffs (FiTs), opened a window of opportunity for RE by making it a secure, financially rewarding investment.

Recognising these subsidy schemes as a chance to expand its community empowerment policy, the Scottish Government branched out its empowerment agenda to RE to encourage communities to take up RE projects to generate an independent source of income and create a significant capital injection in their local economies. To lower the barriers for communities to install a RE scheme, the Scottish Government has gradually expanded its support for CRE, financing project development advice as well as financial support mechanisms such as the flagship Community and Renewable Energy Scheme (CARES) and the Renewable Energy Investment Fund (REIF). To prioritise community energy more, in 2011 the Scottish Government added a goal of 500 MW community and locally-owned RE for 2020, which was later increased to 1 GW (Scottish Government, n.d.). In substantiating this goal, the Scottish government stressed that carrying out a CRE project can lead to skills development, increase of community cohesion and confidence, and support for local economic regeneration (Scottish Government, 2014).

These policies and incentives connect Scotland's drive to replace fossil fuels and cut carbon emissions to a belief in RE technologies' potential for playing a vital role in strengthening communities. Owning renewables is assumed to help building local capacity and give communities financial autonomy to prioritise and address their own needs (HIE, 2015a). According to the Scottish Minister for Business Energy and Tourism, community energy represents a 'tremendous potential to empower people to make the most of their own local resources', (Local Energy Scotland, 2015). In the ministerial foreword of the first national Community Energy Policy Statement, he even envisions a central role for community and local energy expressing that it needs to be brought in 'from the margins of energy policy to make it the central tenet of our future energy systems, where it has the potential to transform local

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economies' (Scottish Government, 2015, p.1). Through 'building close links with energy consumers through community-based organisations' there would be a potential to 'maximise the value of energy generated and to create socio-economic benefits' (Scottish Government, 2015, p.1).

This vision is part of a liberalist understanding of the UK Big Society discourse, characterising it as a progressive response to state and market failure and a wider delegitimization of representative politics. A central tenet of this discourse is that '"communities" are better placed to serve their own needs and make informed choices which are situated in the "grounded" experiences of their lives' (Catney et al., 2014, p. 717). Especially for relatively undiversified rural economies participation in CRE is expected to be a source of empowerment, and simultaneously strengthen social and economic capital (Slee and Harnmeijer, 2017).

Certainly, local ownership is much more beneficial to communities than hosting a commercial equivalent as it leads to more local and collective benefits, which is proven by several economic impact studies (see e.g. Allan et al., 2008; Slee, 2015). In concrete terms, a commercial windfarm would bring in a community benefit fund of around £3000–4000,-/MW to compensate the local community for negative externalities and about £10.000,-/MW rent for the landowner, whereas a community scheme can generate over £100.000–150.000,-/MW per annum (Slee and Harnmeijer, 2017, p.16). This already vast disparity gets even larger when taking into account that local ownership creates revenue spendings in the local economy, while external ownership results in a high share of the revenues leaking away. Such investment can take place in a broad range of areas including health and social care, local regeneration, culture and heritage, local services and amenities, poverty mitigation, social inclusion, sport and recreation, energy and recycling (HIE, 2015b). The actual investment areas will depend on the particular needs of the local community. Therefore, the specific investments and whether these meet the most pressing needs in the community will likely affect the extent to which community members feel empowered by the RE project.

Furthermore, as well as to financial benefits for the local economy, community empowerment is also attributed to the development process of CRE projects. Communities, and notably the smaller group most active in the project development, would be empowered by acquiring project development and RE related knowledge, forming new collaborations strengthening the social fabric of the community, and not least by the very experience of overcoming setbacks and finally accomplishing a challenging project with local volunteers (Callaghan and Williams, 2014; Cinderby et al., 2014; Parkhill et al., 2015).

However, whereas the economic side of the empowering effect of CRE has been researched and substantiated in several studies, the uncountable, qualitative side has hardly been systematically assessed yet. It is not surprising that systematic and comprehensive assessment of the more subtle and qualitative aspects of local impact of CRE is in its infancy. To create the desired 'sensitive and in-depth' type of assessment, extended project-scale evaluation is required (Walker et al., 2007, p.78), and there are several hurdles to overcome before such an assessment can be done. The boundaries of local impact are unclear and should be defined (Chadwick, 2002), and there is little conceptual clarity on definitions of the impacts that are widely recognised within the CRE literature. Also influence of external conditions should be taken into account as local impacts can hardly ever be attributed to one project alone (Ilsekog, 2008). Furthermore, impact pathways are rarely single cause-effect relationships (Ilsekog, 2008). Finally, there are few examples of holistic social impact assessment in other fields, as impact assessment has always had strong links to policy making and had to satisfy budgetary timescales and show tangible outcomes (Walker et al., 2007).

Yet whilst measuring the growth in turnover and other economic analyses (see e.g. Allan, 2012; Allan et al., 2008; Entwistle et al., 2014; Okkonen and Lehtonen, 2015) can serve as a crude proxy, it cannot demonstrate the nature and extent of local impacts such as local economic development, social cohesion and capacity building (HIE, 2015b, p.2). More systematic, and larger scale evidence needs to be constructed (Hobson et al., 2016), as it is unlikely that current government support for CRE will continue just taking the acclaimed social outcomes of CRE as an 'article of faith' (Walker et al., 2007, 2007, p.78). Furthermore, such evidence can help CRE groups' sense of efficacy and agency, guide their activities, and help to mobilise funding (Berka and Creamer, 2018).

Hence, this study aims to contribute methodologically to facilitate the generation of policy relevant evidence regarding the actual local effects of CRE on their host communities so that government support can be evaluated based on evidence instead of acclaimed outcomes. Therefore, the research question is: How can the qualitative, local impacts of CRE be assessed systematically to provide policymakers evaluating policies supportive of CRE with evidence?

To contribute to evaluation tools for the local effects of CRE, this research introduces intrchange mapping, an impact assessment methodology from the field of Social Impact Assessment, into the community energy literature. This methodology can be used to make explicit the mental models community members have regarding the changes a CRE project has brought for the community. The way the methodology can be applied and the type of results it yields are illustrated by a case study assessing the impacts of the community turbine on the residents of the Scottish island Shapinsay in Orkney. The article is concluded by reflecting on both the local impacts on Shapinsay and the methodology by outlining its potential and limitations for assessing local impacts of CRE projects. Finally, the policy implications of the study are discussed.

2. A need for more comprehensive evaluation frameworks

Unlike the factors influencing the uptake and successful implementation of CRE, its outcomes have not received much attention within academic literature (Berka and Creamer, 2018). A recent review on local outcomes of CRE shows that a great many studies merely refer to or loosely observe outcomes, but very few explicitly assess the local impacts with formal impact assessment approaches (Berka and Creamer, 2018). The lack of more comprehensive studies of local impact results in a scattered picture and severely limits the extent to which more detailed, generalisable explanations can be formulated about the circumstances under which different impacts come about.

Existing literature is generally positive and uncritical about the real and expected outcomes of CRE. Community projects would enable cooperation, communication and commitment such that projects can be developed consensually, technologies can be installed in locally appropriate ways, and revenues can be allocated to most pressing local needs within the community (Walker and Cass, 2007). As far CRE communities have been reported to be, amongst others, more cohesive; skilled, knowledgeable, and employable; energy aware, literate and benign; economically and energy independent; politically efficacious; empowered, future-proof, and resilient than before engaging with RE (Rogers et al., 2012; Walton, 2012; Hicks and Ison, 2015; Gubbins, 2010; Slee, 2015; NEF, 2012; Seyfang et al., 2013).

While some of these claims are well supported, what is exactly is meant by umbrella concepts such as resilience, empowerment and future-proof, and how these are operationalised and observed often tends to remain unclear. Furthermore, such benefits are mostly derived from interviews with core members of CRE groups, such as project initiators or board members, which compromises the validity and neutrality of these accounts, and results in a lack of insight on how the broader community experiences the impacts of its CRE project.

Only sporadically critical notes are made or negative outcomes reported, but CRE can be 'locally divisive and controversial' as well (Walker and Devine-Wright, 2008, p. 499). How a project is received depends not only on who is psychologically and legally owning the project and on the associated distribution of benefits, but also on factors such as scale of the project and extent to which the technology is

obtrusive and controversial, pre-existing attitudes within local community to RE and sustainability in general, landscape values and perceived suitability of the location, experiences with previous large infrastructural developments (such as power lines or highways), and the stakeholder management during the development process (Vanclay et al., 2015; Bere et al., 2015).

It was found by Warren and McFadyen (2010) that the community element can ease opposition and create support, but is neither or a panacea for local acceptability of RE, or nor a guarantee of solely positive outcomes. When a CRE project is not inclusive and is rooted only in a small part of the community, a community can get divided on the matter, which can, especially in small communities, be detrimental to the social cohesion (Walker et al., 2010). In particular when decisions benefit some sections of the community at the perceived expense of others (Gross, 2007), because a community is never uniform in its needs and wants.

Altogether much of the evidence on the local impacts of CRE is not the result of formalised impact assessments, which results in biases and blind and black spots in the data. It lacks attention for project and context specific explanations about influences on impacts, such as characteristics of the project, site, community, region, and the project development and engagement process. Hence, more holistic, systematic evaluative frames are needed to prove whether or not CRE projects 'can add up to more than the sum of the small parts of renewable energy generation and carbon reduction' (Walker et al., 2007, p.78).

3. Local impacts of CRE

An assessment of local impacts cannot start with a fixed list of indicators and should be adaptable to the specificities of each CRE project. However, it still needs to start from an awareness of the local impacts that can be encountered. To this end an overview is made of possible impacts of CRE projects gathered from reviews and empirical studies taking stock of CRE's impacts (Hicks and Ison, 2015; Berka and Creamer, 2018; Gubbins, 2010; Slee, 2015; Walton, 2012; Bere et al., 2015; Brummer, 2018). They are summarised into 13 categories.

1. Local economic development: project induced (community/shareholder) income, jobs and services;
2. Reduction of energy costs and fuel poverty;
3. Development of knowledge and skills: related to amongst others project development, community engagement, management or RE technologies;
4. Social cohesion: Effects on bonding and bridging capital, community building and volunteering;
5. Energy literacy: literacy regarding matters such as climate change and RE through information provision and other educational activities;
6. Energy related behavioural change: more environmentally benign lifestyles and increased uptake of other projects addressing climate change and other sustainability issues;
7. Local support for RE: support for a CRE project can be enhanced by collective benefits, community involvement and ownership;
8. Impacts on liveability of the area: nuisance of e.g. visual impact of the technology, and in case of a wind turbine also noise, shading, and air traffic obstruction lighting;
9. Impacts on health and safety: physical manifestation of being exposed to RE technologies, e.g the effect of sensitization after long exposure to low-level noise on sleep from turbines;
10. Impact on the nature in the area: in case of a wind turbine e.g. potential bird and bat victims;
11. Political efficacy and mobilisation: influence on a community's understanding of and influence on its governance, amongst others through increased communication and cooperation between CRE community and its local government;
12. Demographic effects: (co-)induced by local economic development, predominantly in declining rural regions;
13. RE tourism: visits of RE interested (community) groups and people.

These effects can be induced during the project development phase as well as the operational phase, and can change over time. Impacts can also accumulate and flow on from other impacts, for example local economic effects may improve the attractiveness of a rural area as a result of the jobs and services that are financed by RE revenues and help to reduce outmigration.

4. Assessing local impact through mapping theories of change

From an awareness of the scope of the potential impacts the assessment can start. The essence of impact assessment is to establish the perceived chain of causation from the intervention to the impacts and describe the changes that are induced along the chain. For operationalising impact, this study applies a definition from the field of Social Impact Assessment, which studies "the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions […] and any social change processes invoked by those interventions" (Vanclay, 2003, p.1). Here impacts are defined as all issues related to a planned intervention that affect or concern people, directly or indirectly, perceptual or corporeal (Vanclay et al., 2015).

A methodology that can assess such impacts is change mapping. Change mapping can be helpful in understanding dynamics between a project, the host community and contextual factors. As it takes into account both the impacts and the distinctive processes to which these can be attributed, it avoids the frequently occurring magic or black box approach to evaluation: measuring the impacts of a project but failing to develop an understanding of the way in which project endogenous and exogenous factors contribute to the identified outcomes (Brousselle and Champagne, 2011; Funnell and Rogers, 2011). Through change mapping a description can be created of how an intervention, such as a CRE project, contributes to a sequence of impacts (Funnell and Rogers, 2011; Esteves and Barclay, 2011; Franks et al., 2010).

These descriptions are called theories of change, and represent the mental models people have of the change that an intervention causes. They make visible the cascade of cause and effect leading from an intervention to its desired effects.

The change mapping method on which the impact assessment draws, creates theories of change through the following consecutive steps, adapted from Vogel (2012), to a change mapping approach for CRE projects (see Annex 1 for main adaptations):

1) Create a community profile

Establish a comprehensive understanding of the project's context, including social, economic and environmental conditions.

- *Geographic location community;*
- *Main natural resources available to community;*
- *Main sources of livelihood;*
- *Community structure and local institutions;*
- *Available services and their accessibility;*
- *Internal and external sources of vulnerability for the community.*

2) Make a project profile

Map the conditions the project is seeking to influence, and the way in which the desired change is planned to be realised. Be also aware of the conditions the project can unintentionally influence.

- *History CRE group;*

- *Ambitions CRE group;*
- *Composition CRE group;*
- *Organisations collaborating with CRE group;*
- *CRE group activities;*
- *Installed RE technologies and implementation processes;*
- *Decision-making structure;*
- *Definition of community;*
- *Community engagement;*
- *Revenues and allocation;*
- *Internal and external sources of vulnerability for the CRE project.*

3) Construct theories of change

Create an overview of the activities of the CRE group and the changes to the situation before the RE project became operational. Map community members' understanding of how these changes may have happened, and how contextual conditions may have affected their occurrence.

- *Identifying local impacts;*
- *Ranking of outcomes by participants;*
- *Drawing perceived causal models of change for the highest ranked impacts.*

As the change mapping methodology focuses on the impact on the residents of a community, it may be best suited for imapcts that are experienced in the day-to-day community life (from the list in section 3 impact 1–4, 8–10 and 13). Changes in political efficacy and mobilisation (11) may be highlighted by the CRE group members, but are likely not experienced by other community members, so extra attention to these should be paid in the synthesis of the findings. The methodology will not be very suitable to assess the impacts energy literacy, energy related behavioural change, local support for RE (5–7). Creating evidence of these impacts requires dedicated surveys instead of a qualitative, experiantial account, and preferably also a before and after measurement to track change reliably. Finally, many impacts, but especially demographic change (12), are caused by complex multi-factorial processes, and the CRE project may only be part of the explanation for a change in the community. Overdetermism should be avoided by remaining senstive to how project external conditions influence the impact, because a CRE project is only one of many developments in a community.

5. Case study methodology

The change mapping methodology is explored through a case study (Yin, 2013). The case study on which the empirical work draws is the Scottish island Shapinsay's 900 kW wind project. Selection of Shapinsay's turbine scheme has resulted from narrowing down from CRE projects included in a database mapping Scottish and international CRE (Energy archipelago, 2015). To begin with, a wind energy installation was searched for. This technology was expected to deliver tangible social outcomes, because of the high visibility of the turbine within the community, the high profitability of wind energy, and the great organisational capacity completing a wind project is considered to require. Furthermore, a high degree of community-ownership, a middle-sized generative capacity (around 1 MW), several years of operation, and an active community organisation pursuing a variety of community development goals, are used as selection criteria to find a matured project most likely to display a considerable and diverse impact on the community it is part of. These selection criteria and the fact that Shapinsay is a small and well-delineated island community increase the visibility of local impacts. These characteristics make this case study more of a critical case study that is especially helpful to test the change mapping methodology than a typical case, which is representative of an average community RE project (Flyvbjerg, 2006).

For the empirical study, data were collected during a two-week fieldwork visit to Shapinsay. Data were collected through an exploratory survey addressing community members, in-depth interviews and change mapping workshops with community and CRE group members (See Fig. 1). Twelve semi-structured interviews were conducted with employees of the Shapinsay Development Trust (SDT) (2), current and previous board members of the SDT and its trading subsidiary Shapinsay Renewables Ltd. (SRL) (6), and representatives of the Community Council, Orkney Islands Council, Community Energy Scotland, and Highlands and Islands Enterprise (4). The community members involved in the SDT and its trading subsidiary SRL[1] could provide extensive knowledge on the CRE project. The representatives of the various governmental bodies and CRE intermediaries could provide a wider perspective on the local impact in Orkney of RE in general and CRE more specific. These interviews were transcribed and thematically coded (Braun et al., 2019). The exploratory survey (response of 33 out of approximately 130 households) inventoried the impacts residents experience by asking questions on the effect of development process of the project as well as the effect of current activities of the CRE group on community life on Shapinsay. Finally, a separate theory of change workshop for the community and the CRE group were organised, so both groups could talk in a safe environment about the impacts of the project (for each group a session with 7 and 3 participants respectively). Participants were recruited via the exploratory survey, and through poster announcements at the SDT office and local shop. In these workshops, all experienced impacts were identified by the participants and put on sticky notes on the wall, ranked through voting (3 votes per person), and the six that were deemed most important were divided over two groups of participants and developed into a causal diagram representing the participants' theory of change, their understanding of how the change has occurred (through which inputs, activities, outputs the impact has come about). Agreement about the most important impacts was high, which may also be influenced the high share of participants either previously involved in the CRE group or positive about the work of the trust. Unfortunately, no critical community members attended. However, through the exploratory survey also the more critical voices from the community were included in the results.

Prior to the fieldwork, commonly reported social impacts of CRE have been gathered through literature study of academic and non-academic publications to be aware of the possible range of local impacts to be encountered. However, during the fieldwork community and CRE group members were asked to identify the most important impacts of the project off the top of their heads, avoiding influence on the results by prompting. Only during data analysis, the social impacts as found in CRE literature have been used to help grouping the reported experiences.

[1] A Scottish charitable trust is an entity set up to hold and protect assets for charitable purposes. Assets must be clearly defined and the purpose must be for the good of the community. Charities wanting to trade to raise funds in a manner that is not related to their charitable purpose, e.g. trading in RE when the purpose is strengthening the community, have to separate out those trading activities to a subsidiary non-charitable trading company - a private limited company. This protects the charity and its assets from the risks and liabilities of the trade as well as from breaching charity law. The profits of RE generation then flow from the subsidiary to the trust, which can use them for its charitable purpose. Unlike many European countries, where the cooperative structure dominates, this combination of a charitable trust and a wholly-owned trading subsidiary is the most common legal structure among community wind projects in Scotland (Energy archipelago, 2015). At the Orkney Islands, many trusts adopted this structure to the example of earlier community wind projects in Tiree and Gigha that were also funded with Big Lottery grants.

Methods	Description
1. Interviews	• Purpose: Project and community context • Target group: CRE group members, other actors involved in the project (e.g. local government, intermediaries, NGOs) representatives of impacted groups in the community, and other key actors. • Methodological steps: Community profile and project profile.
2. Community survey	• Purpose: General impression range of impacts and wide representation. • Target group: All community members. • Methodological steps: Input for theories of change in the workshops.
3. Workshops	• Purpose: Deepening understanding of how the impact come about through mapping perceived chains of causation. • Target group: CRE group members and other community members. Separate focus groups for CRE group members and other residents. Methodological step: Constructing theories of change.
4. Optional interviews	• Deepening of understanding of impact that is not feasible in a focus group. For example, because of personal nature or other sensitivities, or because the person is exceptionally knowlegdgable on an impact. Another reason may be because some groups may not be able to visit a focus group or comfortable to talk in this setting. • Methodological steps: Constructing theories of change.

Fig. 1. The data gathering process.

6. Assessment of the local impacts of Shapinsay's community turbine

Along the three steps of the change mapping methodology (described in section 4), the local impact of Shapinsay's community turbine on the residents of Shapinsay will be assessed.

6.1. Step 1 community profile

To create a thorough understanding of the context in which the Shapinsay CRE project is embedded, this section will shortly introduce the context in which the project has been taken up by the SDT.

Shapinsay is one of the Orkney Islands off the north coast of mainland Scotland, characterized by rich nature and raw, open landscapes. Its economy is primarily based on agriculture with the exception of a few small businesses that are largely tourism-related.

The island has a small but vibrant community of 300 people, who live spread out over the island at farms, detached houses, and in the small village, Balfour. The village consists of around 50 households, the elementary school, the community centre, the SDT office, the church, a café, a small supermarket and a ferry terminal. From the village ferry terminal, the MS Shapinsay sails six times a day back and forth between Shapinsay and Mainland Orkney. Many of the population in the working age have jobs on Mainland Orkney and use the ferry service for commuting.

Last decades Shapinsay has seen quite a significant change in the balance of its population. On the one hand, the sustainability of its community is threatened because many young people leave the island to follow higher education courses and pursue job opportunities outwit Shapinsay. With the industrialisation of agriculture farms scaled up and jobs in agriculture decreased, but limited other employment opportunities have replaced those jobs. On the other hand, Shapinsay has also seen a considerable influx of people from elsewhere in the UK that are attracted to island life and the natural beauty of the place. This immigration has reached an extent that the people who are born and brought up on Shapinsay are almost a minority. The new residents are mostly people over 40. Resultantly, the population has a lack of youngsters and a surplus of elderly.

Last decade also the rise of renewables has brought major change to Shapinsay. Shapinsay and the other Orkney islands have become a frontrunner in the implementation of renewable energy. The region is blessed with some of the strongest wind, wave and tidal resources in Europe (OREF, 2015), and is already generating more RE than is required for own consumption. Besides housing the European Marine Energy Centre (EMEC), where seagoing technologies are developed, the county is at present home to over 500 domestic turbines, as well as several larger scale wind farms and 8 community-owned turbines (OREF, 2015; Energy archipelago, 2015). Furthermore, with 1 in 12 Orcadian households generating electricity from renewable sources, Orkney has the UK's highest share of households producing their own electricity (OREF, 2015).

However, as a result of the high uptake of wind power in Orkney, the limits of the capacity of its grid have been reached, leading to some turbines being switched off on windy days through real-time Active Network Management. This means that Orcadian wind energy schemes cannot perform to their full potential despite the high wind potential.

6.2. Step 2 Project profile

This section discusses the conditions the project is seeking to influence, and the way in which the desired change is planned to be realised.

The plan to develop a community turbine scheme arose from a lack of funds to address local challenges and ambitions. By the nature of being a small island community, transport has always been a main bottleneck for development of the island. Ferry transport creates extra expenses and is bound to a timetable. As meeting demand in the early morning and in the evening is not profitable, the regular ferry mainly covers standard office hours. Opportunities to undertake activities at other hours were

severely hindered by the high costs of the on-demand charter. Besides reducing flexibility, the required extra link makes island life more expensive. Commuting and travelling are costlier, but transport costs add to all other goods and services as well: from everyday items such as groceries to fertilizer for agriculture. Furthermore, it is often hard to offset these extra costs, because the small population size does not allow for creating economies of scale. Not only households and businesses, but also local governments are confronted with the combination of a small user group and higher provision costs. Consequently, local provision of services such as a care home, swimming pool or public transportation is unviable. However, recognising that service provision is vital to sustain and enhance island well-being and a balanced demographic, in 2002 local residents founded the Shapinsay Development Group at the instigation of the Orkney Islands Council. This group later evolved to the Shapinsay Development Trust, and aims to be a vehicle through which the islanders can collectively help to maintain and improve their lives on Shapinsay through development of extra facilities for social welfare, recreation, and other leisure time occupation; enhancement of education opportunities; protection and preservation of the environment; relief of poverty; assistance in the provision of housing; and stimulation of a positive business climate for trade and industry.

When the 2002 UK Renewables Obligation made RE generation a financially rewarding undertaking by providing a guaranteed feed-in tariff for 20 years, the Trust together with four other Orcadian trusts started exploring the potential for a local turbine encouraged by Highlands and Islands Enterprise (HIE), the Scottish Government's economic and community development agency for the Highlands and Islands region. Aware that the region has one of the strongest and steadiest wind sources within Europe (OREF, 2015), HIE encouraged Orkney's Trusts to investigate their communities' willingness to host a turbine. One CRE initiative in the archipelago, the Westray Development Trust, had already started the process and regularly joined the meetings to share its experiences.

With Feed-in-Tariffs being guaranteed for twenty years, a turbine could be the much desired independent, stable source of revenues to develop a socially, economically and environmentally more sustainable Shapinsay. One of the initiators explains: "Without resources you can have as many committees and meetings as you want, but it is very difficult to achieve things. It is quite difficult to get funding, and since we set up the trust, funding has become more and more difficult in this country because of the recession. Where else are you going to get in the region of £60.000,- a year for a community of 300 folk? […] That helps the community not to stay where it is, but move a bit forward."

After consultation of the island population through a vote for support the development of the community turbine was decided upon. A short further history of the development process of Shapinsay's CRE project and actors involved is presented in Fig. 2.

At the time of the study (2015), the SDT and SRL together had 9 voluntary directors, 5 staff members, 56 members, and a few volunteers. To enhance sharing information within the organisation and give the SDT the comfort that the SRL is acting in the best interests of the SDT, the SRL has two members of the SDT board on its board of five.

Year	Project milestones and involved actors
2002	• Opening of a window of opportunity for CRE through UK RE support schemes and Scottish project development aid; • HIE initiates Community Energy Scotland (CES); • Shapinsay Development Group and other Orcadian community groups are encouraged by HIE, CES, and their local governments to investigate CRE.
2003	• SDG incorporates as a trust, the Shapinsay Development Trust; • Development peer-to-peer support network Community Power Orkney (CPO) after HIE organised community conference; • Network between Orcadian trusts and CES strengthened because of regular meetings for exploring RE projects; • Input from further advanced CRE initiative of Orcadian community Westray.
2008	• Selection of location. Only one site turned out to be feasible as location for the turbine in terms of size, distance to existing infrastructure and grid connection; • Vote for public support for a community wind turbine on Shapinsay, collated by Voluntary Action Orkney. 76% of the community residents over 16 returned their voting slips and 77% of them voted in favour; • Application for planning permission.
2009	• Planning permission; • Grid offer, which was funded through CES; • Founding of SDT's trading subsidiary SRL.; • Big Lottery application through CPO by five Orcadian trusts and CES. In total £2,5 million was awarded. SDT received £435.000, of which £35.000,- for project management and £400.000,- towards the turbine itself.
2011	• Financial close: The rules regarding the European Union's State Aid changed. This made it impossible to both use the Lottery money as capital funding for the turbine and receive a Feed-in-Tariff for generated electricity. The change increased the bank loan considerably; • Leases of the land: The SDT had to negotiate leases with three landowners. Two of them own the turbine site and one of them owns the access track. The three get a yearly rent payment and a percentage of the profit; • Arrival, erection, and commissioning of the turbine.
2012	• The first revenues were handed over by SRL to SDT (£50.000,-).

Fig. 2. Short history of the development process of Shapinsay's CRE project and actors involved.

The allocation of the revenues is based on the most recent Community Development Plan and decided upon by the board of the SDT. As the trust wants to be well-rooted in the community and meet its most pressing needs, it aims to have a representative of each of the three major civil society organisation on the island on its board to inform its work: The Community Association, the Community Council and the Heritage Association. Especially, when it comes to grant applications that the Community Council cannot fund, the cooperation with the SDT is considered to be useful. Due to volunteer fatigue and the limited population this is not always feasible. Further public engagement is done through hosting public meetings discussing potential projects of the trust. It is noteworthy that all meetings, including the Annual General meeting, are open to members and non-members. Furthermore, SDT has a monthly newsletter, is on Facebook and has an own website that is used for announcements.

6.3. Step 3 theories of change

This section discusses the theories of the changes that the project has made to the residents' day to day life on the island. Residents identified these changes as most important impacts of the community turbine in the exploratory survey, interviews and change mapping focus groups.

6.3.1. Local economic development

Here will be elaborated on the effects on the service level and employment attributed to Shapinsay's community turbine.

6.3.1.1. Transport services. Inherent to the island nature of the community, the relative isolation has been identified as one of the main threats to sustaining the population of Shapinsay. The population is too small to have a regular public transport service on the island. Residents without a car or the ability to drive were compromised in their mobility. Especially for the elderly the lack of taxi or public transport services was constraining.

Furthermore, also the access to Mainland Orkney in the early morning and the evening hours was very limited as the last regular ferry service from Kirkwall back to Shapinsay leaves on weekdays at 17.30 and during the weekend at 19.45. People who returned later after for instance holidays, a visit to the hospital, or an evening shift had to stay overnight in Kirkwall to take the first morning ferry to Shapinsay. A private charter was available to residents. However, to make the service viable for the provider, this ferry had to be paid per crossing, not per user. Coming at the price of £60,- for a passage, the charter was not attractive for individuals and was only used for group transport on special occasions. Accordingly, there was a considerable threshold for undertaking evening activities. Residents describe how they felt by times 'stuck' on the island or on Mainland Orkney and the ferry schedule stopped them from undertaking activities reaching from following evening trainings on the Mainland, to participating in evening meetings or just having a night out at the night club or cinema.

Therefore, transport was a main priority for the trust. First trialed with a Big Lottery grant and now financed by the revenues of the turbine, the trust provides an Out-of-Hours boat service, a community bus service and an electric vehicle to increase on and off island mobility. As transport enables people to reach a multitude of destinations, these services induce various other local impacts, such as capacity building and local economic development.

6.3.1.1.1. The Out-of-Hours boat service. Especially, the Out-of-Hours (OOH) boat service is highly valued by the community members. The OOH was by far identified as the main impact of the project. Last year almost 1200 fares were subsidised for a user group of about 40% of the population. A staff member explains that residents have become reliant on the service and that the trust would have 'a revolt' on its hands when the service would be taken away. When the OOH boat was temporarily out of service for a repair, a high number of complaints about its absence and requests for a replacement showed the appreciation for the service.

To avoid harming local employment by creating a competing service, the existing charter's skipper, who is a resident of Shapinay, has been subcontracted by the Trust. The charter is still operated on basis of demand and sailing only in case bookings are made. A drastic change in its affordability is that, because of the subsidy of the Trust instead of £60,- for a crossing, people now pay £7,- per person. The Out-of-Hours boat sails twice a night back and forth between Balfour and Kirkwall after the last regular boat. With a late boat back to Shapinsay at 22.30, the OOH leaves plenty space for evening activities. Furthermore, the 7AM early morning service enables people to get off the island early, which enables residents amongst others to get morning flights or go to off island morning sports competitions.

During the focus group community members identified the main flow on effects of increased off-island accessibility. First, participants described how the OOH service has improved connectivity to off-island centralised services such as the airport and the hospital. Second, they stated that the service has improved access to off-island entertainment and recreation. Third, it was appreciated how the cheaper evening passages enable residents to have non-standard working hours without having to spend the night outwit Shapinsay. Finally, the OOH has made it easier and cheaper to follow off-island evening classes and other trainings. All these opportunities are more accessible now, because having the OOH enables people to pursue these activities without having to pay high ferry costs or finding accommodation for overnight stay. Furthermore, participants also described that the OOH enables Shapinsay to keep its evening surgeries, because the doctors can use the OOH to return to Mainland Orkney after surgery hours.

6.3.1.1.2. The community bus. Although, used by a smaller part of Shapinsay's residents, the buss is seen as the second most important service that the SDT provides. Annually the buss is used for transporting around 900 passengers, serving a user group of around 15% of the islanders.

The weekly lunch club for the elderly used to have an own mini-bus, and when this vehicle needed to be replaced, the Trust had funding to buy a vehicle that could be used by all residents. The bus can be driven by a volunteer driver or a paid driver from the trust. Unless needed for an entire day, residents can use the bus without charge. Especially the elderly benefit from the service as the bus is a disabled mini-bus and has facilities such as a lift to get on board in a wheelchair. Next to the elderly's lunch club, the bus is mainly used for funerals, doctor's surgeries, community events, and off-island community group outings.

6.3.1.1.3. Electric vehicle. After having a temporary electric vehicle (EV) that was financed through the CARES Infrastructure and Innovation fund, the Trust decided to continue the service and lease an electric vehicle from the turbine revenues, making it available without charge. As there are no vehicles for rent on the island, the electric vehicle comes in handy for people who do not own a car or need a temporary replacement. Furthermore, many people tested the vehicle out of curiosity what is like to drive an EV, so the vehicle also makes a contribution to familiarising people with alternative, low-carbon transport options.

The old electric vehicle was used 300 times in one year and had a user group of around 15% of the island.

6.3.1.2. Employment. Creating local employment is identified both as a main motivation behind the project and as a main benefit. A director explains that the trust realised that it probably was not going to be many full-time jobs, but a few part-time positions that would make a little difference. Even more so, because people on Shapinsay regularly combine multiple part-time jobs to make a living and the organisation creates high skill level employment. In total, the project contributes to the employment of 6 residents of Shapinsay, which makes the organisation besides the Council and the owners of the castle one of the main employers on the island.

In terms of direct employment, the SDT has 3 staff members of who 2 are currently funded through a Big Lottery grant. These three positions include a service manager, an admin and finance officer, and an admin and transport officer. Two of the positions are part-time and one is full-time. Furthermore, the SRL employs 2 turbine responders, who take care of responding to faults and basic maintenance of the turbine. They are paid a retainer fee for availability and a compensation per hour for work on the turbine. The SRL also employs a part-time turbine manager who coordinates the work of the turbine responders and does the administration for the trading subsidiary.

In addition, the project creates indirect employment, because the revenues of the turbine are used to subcontract the skipper of the Out-of-Hours ferry. As a result of the subsidy of the SDT, he has seen an increase in average usage from a couple of fares a week to around 100 fares a month.

6.3.2. Knowledge and skills development

Capacity building took two forms on Shapinsay: development of skills and knowledge related to the project by members of the CRE group, and development of vocational and educational skills by community recipients of SWAP funding for training.

6.3.2.1. Project team. During the project development phase members of the trust board developed knowledge and skills related to various aspects of project management and RE technologies. Many board members had pre-existing skills from participation in other community organisations and committees, or had a basic understanding of other aspects that were useful for project development, such as knowledge of financial contracts and other legalities from present or past jobs. Strengths within the board were used where it came in handy, and by times also advice from other community members with a particular expertise was taken in. However, none of the board members or community members had experiences with development of a project with a value of nearly £2.000.000,-. Members of the group of initiators pointed at a variety of skills they had acquired, including management and governance skills, funding allocation, business administration, ICT, legalities, accounting, renewable energy (RE) technology, planning, public engagement, project management and interpersonal skills.

The board members that have been involved in the project development nuance the extent of capacity building by pointing out that all of them acquired skills, but that it were mainly the chair and the Community Development Officer who learnt most as they were most active in getting all arrangements in place to progress the project. However, whereas skills and knowledge in fields such as law, planning and finance were acquired by a limited number of people on the board, directors describe that all board members gained an 'awareness' of the steps that need to be taken and the elements that need to be in place. They point out that they developed a capacity to judge advice in many of the identified fields, which has helped them during their current work. The directors pointed out that through a voluntary role many skills that are transferable to the job market can be developed. An example is one of the former treasurers of the board who further developed accounting skills from her previous job and now has a paid position with the organisation as admin and finance officer and turbine manager. Another example is the knowledge of charity law that one of the directors acquired and can use for her work at a public sector organisation.

This development of project related skills and knowledge expands to the current boards as background knowledge of the project is required for leading the organisation. The skill development is in a narrower field and concerns mainly development of governance, general communication and public engagement skills.

6.3.2.2. Wider community. The organisation aims to support the development of knowledge and skills enhancing the employability of the community of Shapinsay by allocating a part of the revenues to Shapinsay's Way Ahead Programme (SWAP). Education and other training is one of the main purposes this fund supports. From 2012 until 2015 the following trainings have been supported: 3 Health and Hygiene certificates; 5 pesticide trainings; 1 postgraduate diploma; and 1 undergraduate diploma. As far, 10 individuals received training.

6.3.3. Social cohesion

A positive effect on the overall network between individual community members is limited, but present on Shapinsay. The limited extent of the positive effect on private networks between community members can be explained by the fact that Shapinsay had a rather vibrant community life already prior to the project. Increasing social cohesion was never a main objective. However, the community bus and the electric car service make a considerable contribution to the social cohesion on the island for some groups.

Especially the community bus, as it enables less mobile elderly to come together for the weekly lunch club. Furthermore, the vehicles stimulate social activities, because they are increasingly used by community groups and the school to go on excursions outside Shapinsay.

Also the trust's newsletter affects social cohesion. Other community organisations such as the school and the Community Council can make announcements in the monthly, home-delivered newsletter. These announcements range from social happenings to grass cutting and road maintenance. Despite the general perception that the newsletter is slightly complicated for people with no background knowledge in RE and has a quite formal way of presenting information, it is well-read. Participants describe that the newsletter enhances the actual participation in community life as well as the perception of belonging to the community by staying up to date about what is going on.

6.3.4. Visual impact

Despite the fact that Orkney is widely known for the natural beauty of its landscape, most of the residents participating in the study perceive no strong negative effects of the presence of the community turbine. For many participants of the research the turbine was neither a positive nor a negative change. Some residents described that after initial concerns or excitement, the turbine became part of the landscape and stated that it is now just there. They don't find the turbine particularly beautiful, but are also not disturbed by its view. Multiple times it has been argued that the turbine is less of a disturbance than other infrastructure on the island, such as the electricity lines.

A few residents find the turbine a significant disturbance of the island's natural beauty. These residents have the feeling that Shapinsay and Orkney have reached a turbine saturation point. They feel the number of turbines in the region should stay in proportion to other elements in the surroundings to avoid major changes in the character of the landscape. A resident illustrates that it 'gets a bit dizzy' and that it is 'hardly possible to take a picture without a turbine on it'. However, some of them are still moderately positive about having the community turbine as they see it as a necessary trade off to be made for more sustainable energy generation of which the community also reaps the benefits. A sense of ownership is regularly expressed by residents referring to the turbine by its nickname Whirly, or even calling it 'our Whirly'.

Only one couple living close to the site strongly opposed the turbine, and has left the island when the project was granted planning permission. At the time, the trust has managed the protest by being as open as they could be and avoiding to create more division and doubt by entering a discussion with the objectors. They offered the protesters an opportunity to talk to experts to discuss the impact of the turbine in more detail, and also informed them about how to file a complaint at the planning commission. Although these objectors created tension in the small community, the trust believed that they were in their right to protest and should have space for their opposition. The trust only wanted to progress the project when it could count on broad support within the community. Therefore, they had organised a poll to indicate

the support along with a consultation evening before they decided to develop the turbine. To ensure fairness and transparency, Voluntary Action Orkney (a local umbrella organisation for charitable organisations) collated the votes on behalf of the SDT. The result of the vote was announced on radio Orkney, and showed that the objectors were a minority as 76% of the community residents over 16 returned their voting slips and 77% of them voted in favour.

This resistance to the turbine connects to a broader tension on Shapinsay around the desirability of development. Some residents are concerned about the nature of the development that the trust aims for. In particular some of the people who have come to Shapinsay as a life-style decision to live in a rural, little village see the work of the trust as unwelcome change.

7. Conclusion and policy implications

This section concludes the paper by discussing the results of the case study, as well as the potential of the change mapping methodology for impact assessment of CRE and policy advocacy.

7.1. The local impacts of Shapinsay's community wind scheme

When it comes to the local impacts of Shapinsay's wind scheme, the biggest changes residents experience are either direct or indirect effects of the RE revenues. The effects of RE revenue correspond with the effects of community benefit funds of commercial wind projects (Macdonald et al., 2017), but have a higher potential due to the larger influx of revenue. The turbine income is predominantly used to finance some much-desired transport services, which have many positive flow-on effects. One of these flow-on effects is a modest strengthening of the social cohesion as residents feel more connected to each other and to Mainland Orkney, because of the additional transport options provided by the OOH ferry, community bus, electric vehicle and newsletter. In particular having access to services outwit Shapinsay at times not covered by the regular ferry is highly valued. Also, the SWAP fund supporting general community purposes and skills development, the created jobs, and the development of RE knowledge and transferable skills by SDT and SRL members are identified as beneficial outcomes.

The negative impacts of the project are limited. The turbine is generally not perceived as a major intrusion into the landscape. This can partly be explained by the fact that Shapinsay's residents were already accustomed to the sight of turbines in windy Orkney (Langer et al., 2018; Liebe et al., 2017; Wolsink, 2007), and partly by an increase of acceptance and amelioration of the negative feelings because of community ownership and benefits (Warren and McFadyen, 2010; Musall and Kuik, 2011). Furthermore, resistance and negative effects on the social cohesion of the community during the development process have been limited and short-lived, because of the early start of the engagement process and the decision-making power that was given to the community regarding the decision to progress the turbine or not (Gross, 2007; Walker and Baxter, 2017). The trust's transparent and conflict averse attitude in face of opposition has helped to avoid major disruption of the community during the development process.

All in all, can be concluded from the change mapping that on Shapinsay carbon reduction does meet community empowerment, as the impacts of the community turbine are by and large positive. However, a critical note that has to be made despite the largely positive outcomes of Shapinsay's turbine is that the more significant the positive effects are for a CRE community the greater the dependence is when the installed technology cannot meet its production targets, or when subsidies for RE may dry up in the future and the revenue stream from RE will be reduced. The scenario that the community is back to where it was and is left empty handed and disillusioned has been identified by the trust as a major threat.

Not only there has to be found a way to continue the revenue stream at the end of the lifetime of the technology, also during its envisioned operational years revenues and imapcts can get under pressure. Already at present the SDT's revenues are much lower than expected.

The restricted grid access due to congestion of the Orcadian grid is having a major impact as curtailment figures are as high as 30–60% of the turbine's output. Grid extension is at present not at the horizon, so the trusts within Orkney are working on innovative hydrogen economy projects to make local use of the curtailed energy to limit the loss of the turbine's potential and secure a sufficient revenue stream to finance community projects and repay the bank loan. In the BIG HIT project, which builds on the earlier Surf 'n Turf project, surplus electricity generated from renewable energy from Eday and Shapinsay's community turbines and tidal turbines is used to make hydrogen by electrolysis (BIG HIT, n.d.). This hydrogen acts as an energy-storage medium and can later be converted back into heat and power for buildings and vessels, as well as function as fuel for the operation of zero-emission hydrogen vehicles on mainland Orkney.

Besides curtailment, revenues have also been reduced because the UK government terminated the Levy Exemption Certificates by August 2015. The end of this subsidy mechanism meant that the trust lost around £8.000,- of its yearly income, because its production is not exempted anymore from the Climate Change Levy tax.

Hence, these external changes show that the success of a CRE project and, therefore, its impacts depend on wider determinants than the project itself and cannot be looked at in isolation. Impacts need to be enabled by the wider context of the project, such as grid capacity and energy policy.

Thus, despite the gain of some hard-earned energy and financial independence, CRE projects and so communities remain vulnerable to project external changes. This means that the professionalism and the skill set of the community group have to grow to not perish when new obstacles present themselves after the project has become operational. For Shapinsay, teaming up with local and supra local parties to work on a regional hydrogen economy has provided an opportunity for local development.

However, as it is organised now the responsibility to stay empowered is with the CRE groups themselves, whereas they could use support of local governments, experts and intermediaries after their project becomes operational (Callaghan and Williams, 2014). Such support for operational projects to build capacity could for instance take shape as expert advice, monetary support to hire an expert, or facilitating communities of practice amongst CRE groups. The lack of support for operational CRE projects is a situation that needs more political attention, if long-term empowerment is truly sought. Furthermore, academically it would be interesting to research international examples of mature community energy initiatives to see how they sustain their projects and organisations in the long run in different policy climates.

7.2. The potential of change mapping for impact assessment of CRE and policy advocacy

This paper started by addressing the need for more systematic, and larger scale evidence of the local impacts of CRE to inform policymakers on whether the local effects justify support for CRE and, if so, how positive impacts can be harnessed and negative ones can be ameliorated (Hobson et al., 2016; Walker et al., 2007, p.78). This section explains how change mapping for impact assessment of CRE can help to create such evidence, and subsequently discusses how this evidence can be used for policy advocacy.

By making visible mental models of change, change mapping has been a helpful methodology for creating evidence of the local impacts of CRE. The main strength of the methodology is that it does not black box impacts and gives insight in the research participants' perception of causality. Furthermore, information is gathered from a cross-section of a community's residents instead of only the ones actively involved in the CRE group, which avoids a bias towards positive outcomes, resulting in a higher validity.

A limitation is that the methodology is most suitable for small, relatively well-delineated CRE communities where impact can be made visible more easily through this methodology due to local spending of revenues on a small population that directly experiences the RE technology as well as its effects. However, the biggest limitation seems to be that while participant-indicated impact stays close to the experience of the participant, it may not be the most suitable method for creating a systematic overview of impacts. It is expectable that the results comprise impacts that research participants are well aware of and can identify right offhand. This means that effects on which people do not regularly reflect, such as political efficacy, likely not surface as much as other more mundane impacts, such as social cohesion and local economic development, regardless of whether they are induced by the CRE project or not. However, more research is needed to confirm this hypothesis. When prioritsing completeness of the impacts and systematicness, the method could be adapted from participant-identification to systematically addressing all impact categories the researcher wants to create evidence on.

Besides these strengths and limitations, the danger of overdeterminism requires further attention. With any type of impact assessment of CRE it is important to distinguish the role of the CRE project relative to other factors in causing research participants to perceive particular changes. It can be difficult to empirically determine that a particular intervention by a CRE group brings about specific identifiable effects (Ilsekog, 2008), and caution must be taken not to ascribe effects solely to CRE which are also co-determined by other developments. To minimize the risk of overdetermination, documenting the process through which impacts have come about should have a prominent role. Furthermore, openness to and actively examining alternative explanations and complementary contributors to an impact should be part of any impact assessment.

Finally, the question remains how evidence of the local impact of CRE can be used for policy advocacy. First such evidence can help CRE groups' sense of efficacy and agency, guide their activities, and help to mobilise funding (Berka and Creamer, 2018). Thus CRE groups themselves can use concrete evidence of the benefits of their prior undertakings or positive impacts of similar CRE projects when they apply for existing funding opportunities to strenghten their application. This evidence would be strongest if longitudinal impact monitoring of multiple CRE projects could be done to see if changes happen over time, taking stock of trends in impacts. Second, community energy literature points at intermediaries for advocacy (Hargreaves et al., 2013; Hielscher et al., 2013). Organisations that are operating as bridge between research and policy are especially well equiped to bring in evidence on local impact of CRE when a window of opportunity presents itself. ClimateXChange is a Scottish example of such an intermediary.

Declaration of competing interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Annex 1. Main adaptations methodology Vogel

Stages methodology Vogel (2012)	Steps change mapping for CRE
Stage 1: Context for the initiative: analysis of the current state of the problem the project is seeking to influence, the social, political and environmental conditions, and other actors able to influence change.	Reframed to step 1: Community profile. *Establish a comprehensive understanding of the project's context, including social, economic and environmental conditions.*
Stage 2: Long-term change: a statement expressing the long-term change that the initiative seeks to support, from whose perspective it is significant and for whose ultimate benefit.	Reframed to step 2: Project profile. *Map the conditions the project is seeking to influence, and the way in which the desired change is planned to be realised. Be also aware of the conditions the project can unintentionally influence.*
Stage 3: Sequence of events: mapping the sequence of changes that lead to the desired long- term outcome.	Merged and reframed to step 3: Creating pathways of change. *Create an overview of the activities of the CRE group and the changes to the situation before the RE project became operational. Map community members' understanding of how these changes may have happened, and how contextual conditions may have affected their occurrence.*
Stage 4: Assumptions: critical reflection on the change process, making explicit the analytical perspectives on change, the drivers of change and expressing the underlying hypotheses about how these changes could come about. The purpose of making these assumptions explicit is as a check on whether the activities and outputs are appropriate for influencing change in the desired direction in this context.	Regarding stage 5: the diagrams are only constructed during the change mapping workshop but not presented as part of the results in the paper.
Stage 5: Diagram and narrative summary: creating a diagram and narrative that represents the sequence and captures the discussion.	

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